Claims

What is claimed is:

1. A method for virtual address translation, the method comprises the steps of:

a) receiving a memory access request that includes a virtual address;

b) determining whether a physical address translation has been performed for the virtual address, wherein the physical address translation translates the virtual address to an address, wherein the address is a physical address of memory or is further translated to obtain another physical address of the memory; and

c) when the physical address translation or the another physical address translation has been performed for the virtual address, utilizing the physical address or the another physical address to obtain data corresponding to the memory access request.

2. The method of claim 1 further comprises:

when a physical address translation has not been performed for the virtual address, retrieving a physical page address;

determining whether the physical page address corresponds to a physical address requiring further translation;

when the physical page address does not correspond to a physical address that requires further translation, utilizing the physical page address and a portion of the virtual address to produce the physical address.

3. The method of claim 2 further comprises caching the physical address in a translation look aside table.

4. The method of claim 3 further comprises:

when the physical page address corresponds to a physical address that requires further translation, retrieving a second physical page address; and

utilizing the second physical page address and a portion of the virtual address to produce the another physical address.

5. The method of claim 4 further comprises caching the another physical address in the translation look aside table.

6. The method of claim 5 further comprises when data corresponding to the memory access request is cached, utilizing the data.

7. A method for virtual address translation, the method comprises the steps of:

a) translating a virtual address into an address;

b) determining whether the address corresponds to translation memory space;

c) caching the address in a translation look aside table when the address does not correspond to the translation memory space;

Sub C1

d) translating the address into another address when the address corresponds to translation memory space; and

e) caching the another address in the translation look aside table.

8. The method of claim 7, wherein step (a) further comprises:

indexing a page directory based on a first portion of the virtual address to retrieve a page directory entry; and

indexing a page table based on the page directory and a second portion of the virtual address to retrieve a page table entry as at least part of the address.

9. The method of claim 8, wherein step (b) further comprises determining whether the page table entry is in video graphics memory space.

10. The method of claim 9, wherein step (c) further comprises caching the page directory entry, the page table entry, and a third portion of the virtual address as the address.

Sub C1

11. The method of claim 8, wherein step (d) further comprises translating at least the page table entry and a third portion of the virtual address into an address within the video graphics memory space.

12. A virtual address translation module comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to: (a) receive a memory access request that includes a virtual address; (b) determine whether a physical address translation has been performed for the virtual address, wherein the physical address translation translates the virtual address to an address, wherein the address is a physical address of memory or is further translated to obtain another physical address of the memory; and (c) utilize the physical address or the another physical address to obtain data corresponding to the memory access request when the physical address translation or the another physical address translation has been performed for the virtual address.

13. The virtual address translation module of claim 12, wherein the memory further comprises operational instructions that cause the processing module to:

retrieve a physical page address when a physical address translation has not been performed for the virtual address;

determine whether the physical page address corresponds to a physical address requiring further translation;

utilize the physical page address and a portion of the virtual address to produce the physical address when the physical page address does not correspond to a physical address that requires further translation.

14. The virtual address translation module of claim 13, wherein the memory further comprises operational instructions that cause the processing module to cache the physical address in a translation look aside table.

15. The virtual address translation module of claim 14, wherein the memory further comprises operational instructions that cause the processing module to:

retrieve a second physical page address when the physical page address corresponds to a physical address that requires further translation; and

utilize the second physical page address and a portion of the virtual address to produce the another physical address.

16. The virtual address translation module of claim 15, wherein the memory further comprises operational instructions that cause the processing module to: cache the another physical address in the translation look aside table.

17. The virtual address translation module of claim 16, wherein the memory further comprises operational instructions that cause the processing module to utilizing the data when data corresponding to the memory access request is cached.

18. A virtual address translation module comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to: (a) translate a virtual address into an address; (b) determine whether the address corresponds to translation memory space; (c) cache the address in a translation look aside table when the address does not correspond to the translation memory space; (d) translate the address into another address when the address corresponds to translation memory space; and (e) cache the another address in the translation look aside table.

19. The virtual address translation module of claim 18, wherein the memory further comprises operational instructions that cause the processing module to translate the virtual address by:

indexing a page directory based on a first portion of the virtual address to retrieve a page directory entry; and

indexing a page table based on the page directory and a second portion of the virtual address to retrieve a page table entry as at least part of the address.

20. The virtual address translation module of claim 19, wherein the memory further comprises operational instructions that cause the processing module to determine whether the page table entry is in video graphics memory space.

21. The virtual address translation module of claim 20, wherein the memory further comprises operational instructions that cause the processing module to cache the page directory entry, the page table entry, and a third portion of the virtual address as the address.

22. The virtual address translation module of claim 21, wherein the memory further comprises operational instructions that cause the processing module to translate at least the page table entry and a third portion of the virtual address into an address within the video graphics memory space.

Sub C1